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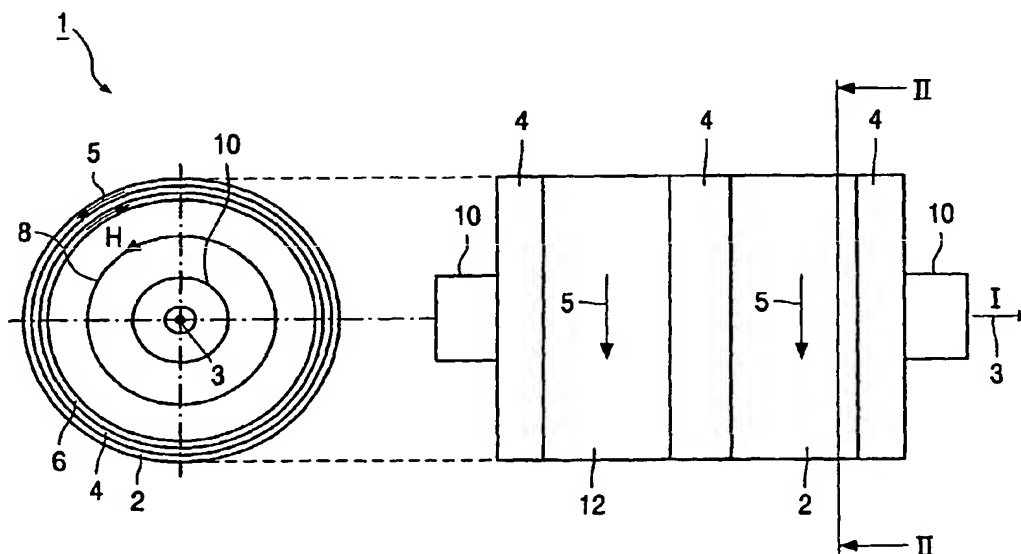
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(54) Title: **SENSOR AND METHOD FOR MEASURING A CURRENT OF CHARGED PARTICLES**



(57) **Abstract:** A current sensor (1) is disclosed for measuring a magnetic field (8) induced by a current of charged particles (3) having at least one magneto resistive sensor element (2;6;12;16) for enclosing the magnetic field induced by the current of charged particles, the magneto resistive sensor element being arranged perpendicularly to the current (3) during use. A method for accurately determining a current of charged particles is also disclosed making use of the current sensor (1). Further a protective switch device (30) is disclosed for protecting a user of an electrical device (31) by switching a supply current to the electric device off in case of malfunction of the electric device is also provided comprising the above current sensor (1).